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WATER SUPPLY OUTLOOK FOR WASHINGTON



U. S. DEPARTMENT of AGRICULTURE ★ SOIL CONSERVATION SERVICE

Collaborating with

DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with Federal, State and private organizations listed inside the back cover of this report.

AS OF
JUNE 1, 1978

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on a measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

COVER PHOTO: SOME OF THE DATA IN THIS REPORT HAVE BEEN RECEIVED THROUGH THE SOIL CONSERVATION SERVICE'S NEW SNOTEL SYSTEM WHICH TRANSMITS INFORMATION VIA THE SPACE AGED METEOR BURST METHOD FROM DATA SITES TO MASTER STATIONS LIKE THESE.

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, West Technical Service Center, Room 510, 511 N.W. Broadway, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	Room 129, 2221 East Northern Lights Blvd., Anchorage, Alaska 99504
Arizona	Room 3008, Federal Building, Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 98, Bazeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1220 S.W. Third Ave., Portland, Oregon 97204
Utah	4012 Federal Bldg., 125 South State St., Salt Lake City, Utah 84138
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82602

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P.O. Box 388, Sacramento, California 95802 --- for British Columbia by the Ministry of the Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia V8V 1X5 --- for Yukon Territory by the Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory Y1A 3V1 --- and for Alberta, Saskatchewan, and N.W.T. by the Water Survey of Canada, Inland Waters Branch, 110-12 Avenue S.W., Calgary, Alberta T3C 1A6.



WATER SUPPLY OUTLOOK FOR WASHINGTON

and
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

Issued by

R.M. DAVIS

ADMINISTRATOR
SOIL CONSERVATION SERVICE
WASHINGTON D C

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Released by

GALEN S. BRIDGE

STATE CONSERVATIONIST
SOIL CONSERVATION SERVICE
SPOKANE, WASHINGTON

In Cooperation with

WILBUR G. HALLAUER

DIRECTOR
DEPARTMENT OF ECOLOGY
STATE OF WASHINGTON

|||||

Report prepared by

**ROBERT T. DAVIS, Snow Survey Supervisor
and**

NORINE P. KENT, Statistical Assistant

SOIL CONSERVATION SERVICE
360 U.S. COURTHOUSE
SPOKANE, WASHINGTON 99201

WATER SUPPLY OUTLOOK

State of Washington

June 1, 1978

** The water supply picture in the state has not changed markedly
** from that reported last month. Precipitation was generally
** above normal which is favorable to an improved water supply
** picture and runoff was substantially below normal which means
** that the water in the mountains is still up there and is yet
** to come down. Very few snow courses are measured as of June 1,
** and those indicate that there is generally an above normal
** snowpack at the higher elevations. The major reservoirs, both
** irrigation and power, are in good shape and are being managed
** according to plan. Uncontrolled releases are not expected and
** most should fill on schedule.
**

THIS IS THE LAST WATER SUPPLY OUTLOOK REPORT FOR 1978.
IF YOU WISH TO RECEIVE THESE REPORTS NEXT YEAR, PLEASE
RETURN THE BACK COVER OF THE MAY 1 REPORT IF YOU HAVEN'T
ALREADY DONE SO.

SNOW COVER

Most June 1 snow surveys are made in the tributary areas of
British Columbia and Montana. Most of the snow at the
Washington measurement sites is normally gone by May 15, and
this year was normal in that respect. The June 1 snowpack is
11 percent above average on the Pend Oreille River Drainage,
10 percent above in the Kettle River Basin, and 44 percent
above on the Okanogan Watershed. No measurements were made in
the Methow and Chelan Drainages, but at Stevens Pass the
snowpack is 32 percent below average. At Stampede Pass, between
the Yakima and Green Watersheds, the snow was gone by June 1,
but on May 25, the snowpack was 10 percent of normal. The only
other watershed that has scheduled measurements is the Baker
River but the readings from these have been delayed.

PRECIPITATION

Rainfall during the month of May was above normal on all watersheds except the eastern slopes of the Cascades. As reported by the National Weather Service, rainfall in the Canadian portion of the Columbia above Castlegar was 19 percent above normal - the same as last month. In the Pend Oreille-Spokane Drainage Division, rainfall was 53 percent above average but in the Northeastern Washington Division, rainfall was only 15 percent above average. Rainfall in the Okanogan Drainage Division was 17 percent below average and in the Central Washington Division, 37 percent below normal. This is in sharp contrast to the precipitation readings by the Bureau of Reclamation at their reservoir sites. The five Bureau precipitation readings indicate that rainfall was 100 percent greater than average.

RESERVOIRS

It appears that all reservoirs are either full or are expected to fill with the runoff.

STREAMFLOW

The cool weather of May has reduced runoff to sub normal amounts at all stations in Washington. This means that the amount of water to be expected is as forecast last month. For example, the May-September forecast for the Columbia River at Birchbank was 86 percent of normal and the May flow at Birchbank was also 86 percent.

RESERVOIR STORAGE - 1000 Acre Feet

BASIN OR STREAM	RESERVOIR	USABLE 1/ CAPACITY	1978	1977	Measured June 1 1976	Normal*
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	225.1	190.0	239.6	269.1	299.8
Columbia	Franklin D. Roosevelt Lake	5232.0	2211.4	2580.9	3740.7	3239.1
Columbia	Banks Lake	714.9	527.9	616.0	648.0	446.7
Okanogan	Conconully Reservoir	13.0	9.2	6.5	13.0	10.4
Okanogan	Salmon Lake	10.5	10.5	9.4	10.5	9.3
Chelan	Lake Chelan	676.1	470.3	391.3	487.8	481.4
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	158.9	140.6	143.7	147.5
Kachess	Kachess Lake	239.0	242.2	223.6	226.5	226.2
Cle Elum	Lake Cle Elum	436.9	441.2	391.8	387.1	387.3
Bumping	Bumping Lake	33.7	34.7	34.9	25.8	27.7
Tieton	Rimrock Lake	198.0	199.0	161.9	177.4	172.0
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir	1404.1	1068.0	689.9	1034.1	708.6
Skagit	Diablo Reservoir	90.6	84.9	86.8	86.6	84.8
Skagit	Gorge Reservoir	9.8	8.2	7.9	9.2	-

^{1/} Based on Active Storage

* 15-year Average 1958-72

PRECIPITATION 1/

Division Average Observations and Departures

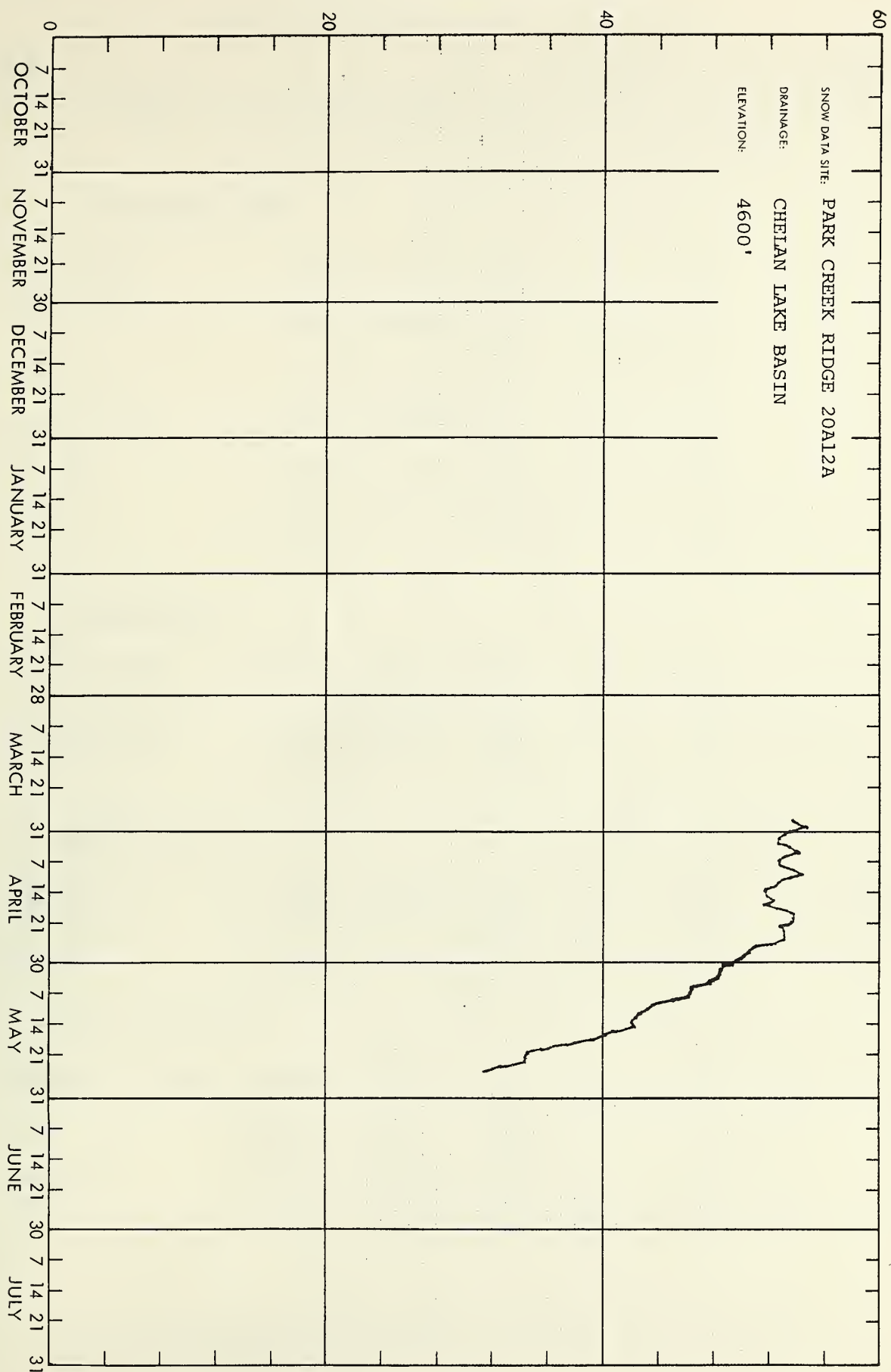
Drainage Divisions	FALL		WINTER		SPRING	
	Sept-Oct Observed	1977 <u>2/</u> Departure	Nov.-1977--Mar.-1978 Observed	Departure	Apr-May 1978 <u>2/</u> Observed	Departure
Columbia in Canada	3.41	-1.61	13.30	-2.21	4.13	+0.66
Pend Oreille - Spokane	4.10	+0.06	17.28	-0.27	5.67	+1.80
Northeastern Washington	2.06	-0.41	10.62	+1.22	3.74	+0.73
Southeastern Washington	2.51	0.0	11.25	+0.82	5.27	+2.34
Central Washington	1.08	+0.11	7.55	+2.27	1.73	+0.38
North Central Washington	1.39	-0.21	8.13	+1.59	2.67	+0.90
Northwest Slope Cascades	11.16	-2.05	52.34	-3.05	10.27	-0.13
Southwest Slope Cascades	9.42	+0.74	40.82	-0.82	9.66	+2.36

Northeastern Washington	- Lower Spokane, Colville, Sanpoil and Lower Kettle Drainages.
Southeastern Washington	- Touchet, Tucannon and Palouse Drainages.
Central Washington	- Yakima, Wenatchee and Chelan Drainages.
North Central Washington	- Methow and Okanogan Drainages.
Northwest Slope Cascades	- Puget Sound Drainages.
Southwest Slope Cascades	- Lower Columbia Drainages.

1/ - Preliminary analysis by National Weather Service from data furnished by Meteorological Services of Canada and the National Weather Service.

2/ - Departure from 15-year (1958-72) drainage division average.

INCHES OF WATER IN SNOWPACK



SNOW DATA TO JUNE 1, 1978 - APPENDIX 1

SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	Number	Elevation				Last Year	Average [#]

U P P E R C O L U M B I A D R A I N A G EPEND OREILLE RIVER

Baree Creek	15B11	5500	5/16	61	33.9	7.8	42.6
Baree Midway	15B16	4600	5/16	28	14.8	1.6	24.5
Baree Trail	15B15	3800	5/16	0	0.0	0.0	0.0
Heart Lake Trail	14C10	4800	5/17	6	2.8	-	10.2
			6/1	Not Measured			1.7
Hoodoo Basin	15C10	6000	5/17	86	43.7	-	48.8
			5/31	75	39.2	-	34.9
Hoodoo Creek	15C01	5900	5/17	79	39.2	-	45.5
			5/31	74	36.9	-	33.5
Lookout	15B02	5250	5/15	43	22.5	0.4	30.9
			5/30	29	14.8	-	-
Nelson	19-Can	3050	5/12	0	0.0	0.0	1.1*
			5/31	0	0.0	-	0.1*

KETTLE RIVER

Big White Mtn.	154-Can	5500	5/15	44	19.3	7.9	18.4*
			6/1	30	14.9	4.0	10.7*
Carmi	126-Can	4100	5/15	0	0.0	0.0	0.0*
Monashee Pass	48A-Can	4500	5/16	16	7.2	3.7	9.2*
			5/29	3.9	1.8	0.0	2.2*

SPOKANE RIVER

Granite Peak	15B13A	6000	6/1	58	24.8	-	-
Lookout	15B02	5250	5/15	43	22.5	0.4	30.9
			5/30	29	14.8	0.0	-
Lost Lake	15B14A	6000	6/1	79	35.8	-	-

OKANOGAN RIVER

Blackwall Mountain	100-Can	6250	5/15	65	30.7	13.0	36.9*
			6/1	Late Report		11.6	29.1*
Brenda Mine	193-Can	4800	5/15	0	0.0	0.0	2.8*
			5/31	0	0.0	-	0.0*
Brookmere	27-Can	3200	5/14	0	0.0	0.0	2.6*
Enderby	130-Can	6250	5/12	103	48.1	30.2	45.0*
			5/29	100	47.4	29.9	38.5*

Average based on 1958-72 average

* Average for years of record

SNOW DATA TO JUNE 1, 1978 - APPENDIX 2

SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (Inches)	
NAME	Number	Elevation				Last Year	Average #

OKANOGAN RIVER (Cont.)

Hamilton Hill	107-Can	4900	5/14	17	9.8	0.0	6.6*
Isintok Lake	152-Can	5510	5/13	17	6.7	0.0	5.2*
Lost Horse Mountain	105-Can	6300	5/15	37	11.8	2.9	10.1*
			6/1	20	7.2	1.2	4.2*
McCulloch	4-Can	4200	5/15	0	0.0	0.0	0.6*
Missezula Mountain	106-Can	5100	5/13	16	7.5	0.0	2.6*
Mission Creek	5A-Can	6000	5/15	50	22.0	12.5	19.4*
			5/30	42	19.9	10.2	12.3*
Monashee Pass	48A-Can	4500	5/16	16	7.2	5.0	9.2*
			5/29	3.9	1.8	0.0	2.2*
Mount Kobau	156-Can	5950	5/12	37	13.9	2.3	10.6*
			5/31	24	9.5	0.0	3.9*
New Penticton Res.#2	183-Can	5225	5/15	19	6.7	0.0	6.6*
			5/30	3.5	1.1	-	1.5*
Silver Star Mountain	99-Can	6050	5/14	67	31.6	11.8	26.5*
			5/28	56	28.5	6.2	16.8*
Summerland Reservoir	3A-Can	4200	5/14	2.0	0.8	0.0	2.7*
Trout Creek	3-Can	4700	5/14	2.8	1.0	0.0	1.9*
Vaseux Creek	233-Can	4600	5/15	0	0.0	0.0	0.4*
White Rocks Mountain	70-Can	6000	5/12	53	24.3	0.9	21.3*
			5/31	33	16.4	-	15.5*

ENTIAT RIVER

Blue Creek G.S.	20B28a	5425	5/30	42	22.7	0.0	-
Entiat Meadows +	20A33a	4540	5/30	30	16.2	0.0	-
Entiat River Trail +	20A34a	3325	5/30	0	0.0	0.0	-
Four Mile Ridge +	20B27a	6800	5/30	72	38.9	0.0	-
Fox Camp +	20A36a	6510	5/30	110	59.4	22.1	-
Pope Ridge	20B20	3540	5/25	0	0.0	0.0	-
Pugh Ridge +	20A32a	6725	5/30	61	32.9	0.0	-
Shady Pass	20A37	6200	5/25	43	23.0	0.0	-
Snow Brushy +	20A35a	3910	5/30	0	0.0	0.0	-
Tommy Creek +	20B21a	4900	5/30	0	0.0	0.0	-

WENATCHEE RIVER

Stevens Pass	21B01	4070	5/12	76	38.0	15.5	48.3
			5/30	48	24.7	-	36.5
Stevens Pass Sand Shed	21B45	3700	5/12	32	16.0	0.0	-
			5/30	5.8	2.9	-	-

+ Snow water equivalent estimated from aerial stadia observation

Average based on 1958-72 average

* Average for years of record

SNOW DATA TO JUNE 1, 1978 - APPENDIX 3

SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (Inches)	
NAME	Number	Elevation				Last Year	Average ^{##}

YAKIMA RIVER

Stampede Pass SP	21B10	3860	5/15	18	9.4	-	33.6
			5/25	3.3	2.0	-	18.8

LOWER COLUMBIA DRAINAGEPUGET SOUND DRAINAGEGREEN RIVER

Stampede Pass SP	21B10	3860	5/15	18	9.4	-	33.6
			5/25	3.3	2.0	-	18.8

SKYKOMISH RIVER

Stevens Pass	21B01	4070	5/12	76	38.0	15.5	48.3
			5/30	48	24.7	-	36.5
Stevens Pass Sand Shed	21B45	3700	5/12	32	16.0	0.0	-
			5/30	5.8	2.9	-	-

BAKER RIVER

Baker Pass +	21A27a	4900	6/1	Marker down	57.0	-
Dock Butte	21A11A	3800	6/1	Late Report	20.0	58.0
Easy Pass	21A07A	5200	5/15	144	72.0	-
			6/1	Late Report	30.0	73.6
Jasper Pass	21A06A	5400	5/15	150	75.0	-
			6/1	Late Report	41.0	84.2
Marten Lake	21A09A	3600	5/15	72	36.0	-
			6/1	Late Report	33.0	66.2
Mount Blum +	21A18a	5800	5/15	148	74.0	-
			6/1	Late Report	50.0	-
Rocky Creek	21A12A	2100	5/15	0	0.0	-
Schreibers Meadow	21A10A	3400	5/15	30	15.0	-
			6/1	Late Report	3.0	48.6
S. F. Thunder Creek	21A14A	2200	5/15	0	0.0	-
Watson Lakes	21A08A	4500	5/15	Not Measured	-	73.5
			6/1	Late Report	28.0	61.4

Average based on 1958-72 average

+ Snow water equivalent estimated from aerial stadia observation

CORRECTIONS AND ADDITIONS - 1978 SNOW REPORTS - APPENDIX 4

SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	Number	Elevation				Last Year	Average #

March 1

SPOKANE RIVER

Sunset	15B09A	5600	<u>3/2</u>	<u>117</u>	<u>41.6</u>	-	33.7
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May 1

SPOKANE RIVER

Above Burke	15B08	6100	<u>4/29</u>	28	13.4	4.7	-
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Average based on 1958-72 average

Agencies Assisting with Snow Surveys

GOVERNMENT AGENCIES

Canada:

Ministry of the Environment, Water
Investigations Branch, Victoria, British Columbia

States:

Washington State Department of Ecology
Washington State Department of Natural Resources

Federal:

Department of the Army
Corps of Engineers
U. S. Department of Agriculture
Forest Service
U. S. Department of Commerce
NOAA, National Weather Service
U. S. Department of the Interior
Bonneville Power Administration
Bureau of Reclamation
Geological Survey
National Park Service

PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.
Pacific Power and Light Company
Puget Sound Power and Light Company
Washington Water Power Company

OTHER PUBLIC AGENCIES

Okanogan Irrigation District
Wenatchee Heights Irrigation District

MUNICIPALITIES

City of Tacoma
City of Seattle

Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.

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